

1. General Aspects

In the EURAMET technical committee for Metrology in Chemistry (TC-MC), there are 32 contact persons and 6 contact persons with observer status. 23 European members (NMIs) and 21 associate members (A-DIs) take part in TC-MC activities.

The TC-MC committee has four technical subcommittees. The conveners of the subcommittees are Janneke von Wjik (VSL, Netherland) for gas analysis, Mine Bilsel (UME, Türkiye) for bio and organic analysis, Rainer Stosch (PTB, Germany) for inorganic analysis and Matilda Rozikova (CMI, Czech Republic (from November 2022 following Daniela Stoica (LNE, France)) for electrochemical analysis. Teemu Näykki (SYKE, Finland) started as new TC-MC chairperson in June 2022 following Sophie Vaslin-Reimann (LNE, France).

2. Projects

The following TC-MC study was completed:

- EURAMET 1470 Measurement capabilities for the quantification of ethanol in water

The comparison has been completed and results are published in the [KCDB](#)

The following TC-MC studies are in progress at the time of this report:

- EURAMET 1424 Determination of Elements in River Water
- EURAMET 1455 Comparison on determination of gold content in white alloy
- EURAMET 1471 Value assigned forensic alcohol in water reference materials
- EURAMET 1480 Comparison for particle number concentration
- EURAMET 1503 Automotive exhaust gases
- EURAMET 1521 Supplementary comparison of "Measurement of PAHs in Protein Matrix"
- EURAMET 1564 Bilateral comparison: Calibration of conductivity probe in low conductivity range (20 $\mu\text{S/cm}$ and 100 $\mu\text{S/cm}$)

2 projects are run by the subcommittee Gas Analysis. The subcommittee for Inorganic Analysis runs 2 and the subcommittee Electrochemical Analysis runs 1 project. The subcommittee Bio and Organic Analysis runs 3 projects.

3. Comparisons

The following EURAMET key and supplementary comparisons in the metrology area "Amount of Substance" are registered in the key comparison database (KCDB) of the BIPM:

Measurement period	Comparison Identifier	Status	Sub-field
2000	EURAMET.QM-K3	completed	Gases
2000 - 2001	EURAMET.QM-K4	completed	Gases
2002 - 2003	EURAMET.QM-K1.c	completed	Gases
2003	EURAMET.QM-K17	completed	Electrochemistry
2005	EURAMET.QM-S1	completed	Gases
2006 - 2009	EURAMET.QM-S2	completed	Inorganics
2007 - 2008	EURAMET.QM-S3	completed	Gases

2009	EURAMET.QM-K4.1	completed	Gases
2009 - 2010	EURAMET.QM-S4	completed	Gases
2011	EURAMET.QM-K12	completed	Organics
2011 - 2012	EURAMET.QM-S6	completed	Gases
2011 - 2012	EURAMET.QM-S5	completed	Gases
2012	EURAMET.QM-K26.a	completed	Gases
2012	EURAMET.QM-S9	completed	Gases
2012	EURAMET.QM-S8	completed	Gases
2013	EURAMET.QM-S7	completed	Electrochemistry
2014	EURAMET.QM-S10	completed	Gases
2014	EURAMET.QM-K111	completed	Gases
2017	EURAMET.QM-S11	completed	Inorganics
2019 - 2020	EURAMET.QM-S14	completed	Organics
2019	EURAMET.QM-S12	completed	Electrochemistry
2019 - 2020	EURAMET.QM-S13	in progress	Organics
2021	EURAMET.QM-K3.2019	in progress	Gases
2022 - 2023	EURAMET.QM-S15	Planned	Organics

4. CMCs

In the completed CMC cycle XXIII, total of 177 (79 new, 87 modified & 11 greyed-out) CMCs were submitted for intra-EURAMET by 17 NMI/DIs from 16 countries and reviewed by EURAMET SC convenors and experts.

The claims covered 7 working groups (EAWG; GAWG; IAWG; IRWG; OAWG; NAWG and PAWG). No broad scope claims were submitted in this cycle.

The cycle XXIII included mandatory re-review of certain Gas CMCs: Claims that are under re-review in 2022 covered cover all existing claims made in 2001- 2010 covering all environmental, forensic, medical, and "other" claims (exception for VSL: claims submitted in 2001-2002 minus fuel or high purity claims).

During the intra-EURAMET review, 151 CMCs were accepted & 26 CMCs of the submitted claims were rejected during the intra-regional review (withdrawn or not accepted). These 151 CMCs were forwarded to inter-RMO review. The inter-RMO review took place between March and September 2022.

In the current CMC cycle XXIV, 304 CMCs were submitted: 192 new, 111 modified, 1 reinstated greyed out CMC, proposed by 17 NMI/DIs from 16 countries. The claims covered 8 categories (1, 3, 4, 5, 9, 11,12 &13).

The current cycle XXIV includes mandatory re-review of certain Gas CMCs: Claims that are under re-review in 2023 covers all fuel and high purity claims (exception for VSL: all environmental, forensic, medical, and "other" claims submitted in 2002-2010 minus any fuel or high purity claims from 2001-2010). Claims re-reviewed in 2024 will cover all fuel and high purity claims of VSL from 2001-2010. No broad scope claims were submitted in this cycle.

The technical review was done at the subcommittee meetings held on 31st January 2023 after a pre-review by appointed technical experts. The intra-regional review was done according to EURAMET Guide No. 3, based on JCRB criteria. Relevant and valid Key Comparisons, Pilot Studies and further evidence such as peer reviewed papers and technical reports were considered as supporting evidence. All CMCs were accompanied by a EURAMET TC-Q approved self-declaration on the underlying quality management system.

After intra-regional review, on the 24th of February 2023, 274 CMCs were forwarded for review to the JCRB. The inter-RMO review started quick after and is still ongoing.

On 23 March 2022, TC-MC decided to adopt EURAMET's position regarding collaboration with federal or public institutions from Russia or Belarus as consequence of the Russian invasion of Ukraine: EURAMET being deeply concerned about the Russian invasion of Ukraine and its implications, the Board of Directors recommended that all EURAMET projects and activities involving federal or public institutions from Russia or Belarus are to be terminated, suspended, or concluded without Russian or Belarussian participation. With regard to CMCs, EURAMET's policy is to refrain from reviewing CMC submitted by Russia or Belarus.

5. Activities of the Subcommittees

All four TC-MC Subcommittees' activities were reviewed by EURAMET BoD in the beginning of 2023 and their periods were renewed for next 5 years.

The technical subcommittees reconvened ahead of the annual TC-MC plenary meeting on 31st January 2023 at LNE in Paris. Topics of the meetings were in progress and new projects/comparisons, the intra-RMO review of the CMC cycle XXIV, technical presentations and strategic discussions.

Subcommittee on gas analysis:

- 29 participants from 20 different institutes attended the meeting
- 3 running Euramet projects were presented
 - Euramet 708: bilateral comparisons between NIST and VSL
 - Euramet 1305: OVOCs (bilateral comparisons between NPL and VSL)
 - Euramet 1480: Pilot comparison for particle number concentration up to 500000 cm⁻¹
- 2 new Euramet project were presented
 - Supplementary comparison for BTEX (LNE)
 - NPL-NIST bilateral (NPL)
- Presentations of 6 EMPIR/EPM projects were given
 - 19ENG03 MefHySto (Heinrich Kipphardt, BAM)
 - 19EVN05 STELLAR (Paul Brewer, NPL)
 - 19ENV06 MetClimVOC (Celine Pascale, METAS)
 - 19ENV09 MetroPEMS (Javis Nwaboh, PTB)
 - 19NRM03 SI-Hg (Iris de Krom, VSL)
 - 21GRD10 QuantiAgremi (Axel Fouqueau, LNE)
- European Metrology Networks EMN Energy gases, EMN Climate&Ocean Observation and EMN Pollution monitoring were presented
- 12 institute (11 countries) submitted CMCs for Cycle XXIV

- 263 CMCs submitted for review (160 new claims, 103 revised) and were under review at the time of the SCGA sub committee meeting.

Subcommittee on bio- and organic analysis:

- 20 participants from 12 different institutes attended the meeting. Still predominantly organic in nature, each year more discussion on bio than in previous years (increasing participation level).
 - 9 organic and 2 bio CMCs were submitted for review for Cycle XXIV from 5 countries (9 new, 1 revised, 1 reinstated greyed-out) and were under review at the time of the SCBOA sub committee meeting.
- On-going or finalised EURAMET comparisons
 - EURAMET.QM-S13 “Comparison of value assigned forensic alcohol in water reference material (LNE)
 - EURAMET.QM-S14 “Measurement capabilities for the quantification of ethanol in water” (BAM)
 - EURAMET.QM-S15 “Supplementary comparison for PAHs in protein matrix” (METAS)
- The proposed EURAMET comparison
 - Endocrine disrupting compounds in water (LNE)
- Béatrice Lalere (LNE) presented results of EMPIR project for endocrine disrupting compounds (EDC-WFD)
- Bertille Bonnaud (LNE) presented European Metrology network for Pollution monitoring
- Claudia Swart (PTB) presented outcomes of the CardioMet project
- Discussion of the ideas for PRT proposals for the EPM call 2023:
 - Manufacturing of commutable Reference Materials for calibration and post-market surveillance of IVD tests” - Vincent Delatour (LNE)
 - TP INDUSTRY: Metrology underpinning the assessment of contaminant levels in food packaging derived from recycling and biobased materials - Chiara Portesi (INRIM); Targeted analytes: mineral oils, PFAS, inorganics
 - TP INDUSTRY: Development of a mass spectrometry method as tool for industries for metrological traceability of food extracts used in the food allergy diagnosis - Chiara Portesi (INRIM)
 - TP NORMATIVE: Validation on-site and on-line devices for water quality monitoring – Beatrice Lalere (LNE)

Subcommittee on inorganic analysis:

- 17 participants from 14 different countries attended the meeting.
- The status of 2 EURAMET projects (1424 & 1455) were presented and discussed.
 - Project 1424 has been completed and report of supplementary comparison EURAMET.QM-S11 approved.
- The status of JRC CMCs was discussed. In 2018 their CMCs were greyed-out (82 CMCs in QM; 60 in the field of IAWG). Due to discontinuation of some activities and new areas of interest, the JRC decided to delete 79 CMCs in 2022, and re-instate 3 CMCs.
- Jožef Stefan Institute (IJS, Slovenia) had issue on SI-traceability with „IRMM-530R“ (0,1% Au in Al) reference material, as it was not linked to a CMC. In October 2022 IJS announced new pathway for SI-traceability based on several activities:
 1. internal comparison of IRMM-530R against new ERM-EB530A (Al - 0.1% Au)
 2. internal comparison of IRMM-530R against NIST SRM 3121 Au standard solution

3. independent analysis of IRMM-530R made by NIST
 - International reviewers have assessed the results and measures and found them to be sufficient. IJS CMCs were accepted and published in the KCDB; new source of traceability: NIST
- 10 new inorganic CMCs from 3 NMIs belonging to 2 categories (5 & 9) were submitted in cycle XXIV and discussed. CMCs were based on EURAMET.QM-S11 supplementary comparison, and all the claims were approved. Additionally, 10 new CMCs in the field of Surface analysis were assigned to subcommittee of inorganic analysis, as there is no SAWG counterpart in EURAMET TC-MC. Three of the CMCs were approved at the time of the SCIA sub committee meeting.
- 3 PRT ideas for the EPM calls 2023 were presented and discussed:
 - Metrology for innovative tools for the in-situ and on-line water quality monitoring (LNE, France).
 - Harmonized “bottom-up” evaluation of the uncertainty of complex measurements (IH, Portugal)
 - Nanomaterials in regulated consumer products (LCG, UK).

Subcommittee on electrochemical analysis:

- 10 participants from 10 different institutes attended the meeting.
- Steffen Seitz (PTB, Germany) presented the current status of EURAMET project 1564 (Bilateral PTB/LNE comparison on conductivity of pure water). The comparison was subsequent to EURAMET 1462 / CCQM-SC EURAMET.QM-S12
- 9 CMC claims (2 new, 7 modified) from 4 countries (Czechia, Denmark, Poland, Germany) were submitted and discussed.
- 1 PRT idea for the EPM calls 2023 were presented and discussed:
 - Unified acidity for industrial applications (Agnes Heering, University of Tartu, Estonia)

6. Participation in EMPIR/EPM

EMPIR 2018 [TP Health, Normative] with following projects that should have ended Mid-2022:

those projects with an “*” have been rescheduled and postponed due to the health crisis (end Mid-2023).

EMPIR 2018 TP Health

- 18HLT02 **Aerotox** "Measurements for mitigating adverse health effects from atmospheric particulate pollutants"
- 18HLT03 **SEPTIMET*** "Metrology to enable rapid and accurate clinical measurements in acute management of sepsis"
- 18HLT09 **NeuroMet2*** "Metrology and innovation for early diagnosis and accurate stratification of patients with neurodegenerative diseases"
- 18HLT10 **CardioMET*** "Providing the measurement infrastructure to allow quantitative diagnostic methods for biomarkers of coronary heart diseases"

EMPIR 2018 TP Normative

- 18NRM01 **EDC-WFD*** "Metrology for monitoring endocrine disrupting compounds under the Water Framework Directive"
- 18NRM04 **Heroes** "Determining new uncertainty requirements for increasingly stringent legislative HCl industrial emission limits"

EMPIR 2018 Networks

- 18NET01 **Energy Gases** "Support for a European Metrology Network for energy gases"

- 18NET02 **TraceLabMed** “Traceability in Laboratory Medicine”
- 18NET04 **ForClimateOcean** “Climate and Ocean Observation”

EMPIR 2019 TP Environment

- 19 ENV 01 **MetClimVOC** “Metrology for Climate relevant Volatile Organic Compounds”
- 19 ENV 07 **METROPEMS** “Improved vehicle exhaust quantification by portable emission measurement systems metrology”
- 19 ENV 05 **STELLAR** “Stable Isotope Metrology to enable Climate Action and Regulation”

EMPIR 2019 TP Energy

- 19 ENG 04 **MetroHyVe 2** “EMPIR Metrology for Hydrogen Vehicles 2”
- 19 ENG 03 **MefHySto** “Metrology for Advanced Hydrogen Storage Solutions”

EMPIR 2019 Normative

- 19 PRN 03 **SI-HG** “Metrology for traceable protocols for elemental and oxidised mercury concentrations”

EMPIR 2020 Industry

- 20IND13 **Decarb** “Metrology for Decarbonising the Gas Grid”
- 20IND 14 **MetroCycleEU** “Metrology for the recycling of Technology Critical Elements to support Europe's circular economy agenda”

EMPIR 2020 Normative

- 20NRM04 **MetrIAQ** “Metrology for the determination of emissions of dangerous substances from building materials into indoor air”
- 20NRM08 **SapHTies** “Metrology for standardized seawater pH measurements in support of international and European climate strategies”

EMPIR 2020 Joint Network Project

- JNP-W01 **Clean Energy** „Support for a European Metrology Network for clean energy“
- JNP-W04 **Food-MetNet** “European Metrology Network on Food Safety”
- JNP-W03 **POLMO** “European Metrology Network on Pollution Monitoring”

EPM 2021 Green Deal

- JRP-V01 **MetCCUS** “Metrology support for carbon capture utilisation and storage”
- JRP-V03 **MetPOEM** “Metrology for the harmonisation of measurements of environmental pollutants in Europe”
- JRP-V06 **PlasticTrace** “Metrological traceability of measurement data from nano to small-microplastics for a greener environment and food safety”
- JRP-V09 **Met4H2** “Metrology for the hydrogen supply chain”

EPM 2022 Health

- JRP-h01 **GenomeMET** “Metrology for genomic profiling to support early cancer detection and precision medicine”
- JRP-h03 **MetrINo** “Metrology for innovative nanotherapeutics”
- JRP-h06 **NEuroBioStand** “Standardisation of measurements of neurodegenerative disease biomarkers”

EPM 2022 Normative

- JRP-n02 **STANBC** “Standardisation of Black Carbon aerosol metrics for air quality and climate modelling”

EPM 2022 Digital Transformation

- JRP-d03 **FunSNM** “Fundamental principles of sensor network metrology“

The projects cover all the grand challenges of the EMPIR/EPM targeted program, thus indicating the cross-disciplinary nature of the TC-MC itself.

7. Capacity Building: Activities of the last year and future needs

- In Feb 2023, workshop was organised to prepare the ongoing 2023 EMP calls.
- **TC-MC** has 6 contact persons with observer status: Robert Wielgosz (BIPM), Abdulrahman R. Alaskar (SA) and Yevsei Levbarh (SE “Ukrmetrteststandard”, Ukraine). Holger Gerwig (UBA/Germany) and Vladimir Aleksandrov (KazStandard, Kazakhstan) are observers attending Gas Analysis Subcommittee and Bibinur Zhanasbayeva, (KazStandard, Kazakhstan) is observer attending Electrochemical Analysis Subcommittee.
- **TC-MC** welcomed Izolda Garsevanishvili (GEOSTM, Georgia), Michela Della Negra (DFM, Denmark), Julijana Pecalevska (BoM, North Macedonia) as new contact persons.
- **TC-MC SCBOA** welcomed Jasmina Zukan Banovic (DMDM, Serbia) as new SC contact person.
- **TC-MC SCGA** welcomed Luka Gazevic (DMDM, Serbia) and Vladimir Aleksandrov (KazStandard, Kazakhstan, observer status) as new SC contact persons.
- **TC-MC SCEA** welcomed Michela Della Negra (DFM, Denmark) and Bibinur Zhanasbayeva, (KazStandard, Kazakhstan, observer status) as new SC contact persons.
- TC-MC experts have participated in KCDB 2.0 training events organised by BIPM
- TC-MC was presented in EURAMET virtual pavilion at BIPM-WMO workshop “Metrology for Climate Action”
- TC-MC has set up Sharepoint for fostering internal communication.
- DI Status of Slovenian « National Institute of Chemistry (MIRS/KI) » has been cancelled
- In future, guidance is needed for application of the current procedures related to dark uncertainty. Concrete examples are needed for different areas in chemistry.
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8. Meetings

First time since April 2020, the annual TC-MC meeting was organised as face-to-face event on 31st of January to 2nd of February 2023 at LNE in Paris.

During the previous week before the TC-MC meetings, the meeting of the strategy working group was organized as online event.

On the first day of the TC-MC meetings, the four technical subcommittees on gas analysis, bio and organic analysis, inorganic analysis and electrochemical analysis convened simultaneously. Topics of the meetings were in progress and new projects/comparisons, the intra-RMO review of the CMC cycle XXIV, technical presentations and strategic discussions.

The plenary meeting took place on the 1st and 2nd of February 2023. On the first day of the plenary, activities and current news from EURAMET (Julien Vuillemin-Toledo), and from TC-MC (Teemu Näykki) were presented. Additionally, several short presentations were given by selected TC-MC members, associates and observers as well as liaison organisation (EURACHEM and EUROLAB).

After lunch, highlights from the TC-MC subcommittee activities were presented by the subcommittee convenors, which was followed by a brainstorming session/workshop for next EPM call with 8 presentations of draft PRTs by TC-MC members.

On the second day of the plenary Dr. Robert Wielgosz from BIPM presented CCQM/BIPM activities. This was followed reports from selected CCQM meetings: GAWG (Paul Brewer, NPL), EAWG (Steffen Seitz, PTB), OAWG (Mine Bilsel, UME), IAWG (Paola Fisicaro, LNE) as well as of the three bio-WGs (Claudia Swart, PTB).

After the coffee break, TC-MC management was presented by the TC-MC chair. in the end of the plenary session recent outcomes and future steps of 5 running EMNs were presented [Climate and Ocean Observation (Céline Pascale); Laboratory Medicine (Vincent Delatour), Energy gases (Annarita Baldan), Pollution monitoring (Nathalie Guigues), Safe and sustainable food (Chiara Portesi)].

The next annual TC-MC meeting is scheduled for February 2024 and it will be held in Delft, Netherlands.

9. Issues

Enhancing internal and external communication is important after time of Pandemics. Several persons have changed during last years and networking sessions are needed during the meetings.

War in Ukraine affects to projects and key comparisons causing e.g. significant delays. Issue especially in the field of Electroanalytical chemistry.

10. Strategic Planning

- CCQM comparisons are covering most of the need for all EURAMET members in the specific area. There is no serious limitation to the number of participants, as CRM can be shipped worldwide easily.
- EURAMET comparisons are mainly SCs or pilot studies, to cover new and additional regional needs outside the CCQM core competencies approach. They are also often performed in the scope of Joint Research Projects (JRP).
- Strategy working group discussed and agreed to deepen the collaboration with VAMAS (Versailles Project on Advanced Materials and Standards). The primary contact in EURAMET will be through EMN Advanced Manufacturing, but some technical working groups of VAMAS are also linked to the implementation of TC-MC.
- The closer collaborations of TC-MC with PARC (European Partnership for the Assessment of Risks from Chemicals) & Eurolab (the European Federation of National Associations of Measurement, Testing and Analytical Laboratories) is foreseen in the next future.

11. Outlook for 2023/2024

- Success of the CMC cycle XXIV within KCDB 2.0.,
- Preparation of the EPM calls 2024,
- Organisation of the next TC-MC plenary meeting in February 2024 (location Delft, Netherlands),

- To continue putting into service the Share point for TC-MC,
- Contribution to the Communication Group of EURAMET to improve the visibility of TCs.

